

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claim 30 is requested to be cancelled without prejudice or disclaimer.

Claims 1-2, 4-6, 9-12, 14-22, 24, 27-29, 31-33, 35, 37-45, 47, 50-54, 56 and 59-63 are currently being amended.

Claims 64-70 are being added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-2, 4-6, 9-12, 14-22, 24-29, 31-33, 35-45, 47-54 and 56-70 are now pending in this application.

Rejections under 35 U.S.C. § 112

Claims 4, 24, 35, 47, 51 and 56 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Each of claims 4, 24, 35, 47, 51 and 56 are currently being amended. These amendments eliminate the indefiniteness in each of claims 4, 24, 35, 47, 51 and 56.

Specifically, claim 4 was considered indefinite due to the presence of the phrase "according to claim", which was the result of a typographical error. Applicant has corrected the typographical error, and claim 4 is now in definite form.

In claim 24, the phrase "can be" was considered indefinite for allegedly failing to show positive recitation. Applicant has amended claim 24 to remove the cited language, and claim 24 is, therefore, now in definite form.

Claim 35 allegedly lacked antecedent basis for "the predetermined criterion". Claim 35 has been amended to depend from claim 32, thereby providing antecedent basis for "the predetermined criterion". Thus, claim 35 is now in definite form.

Claim 47 was considered indefinite for being dependent from a canceled claim. Applicant has amended claim 47 to correct the dependency. Thus, claim 47 is now in definite form.

Claim 51 was rejected for reciting the word "can". Applicant has amended claim 51 to delete the objectionable language. Accordingly, claim 51 is now in definite form.

Claim 56 was rejected as being indefinite for reciting "can be". Applicant has amended claim 56 to delete the objectionable language. Accordingly, claim 51 is now in definite form.

Accordingly, the rejections under 35 U.S.C. § 112 should now be withdrawn.

Rejections under 35 U.S.C. § 101

Claims 54 and 56-63 were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. The Office Action argued that claim 54 "calls for a signal claim and there is no sufficient structure...." Applicant has amended claim 54 to recite a "video signal, recorded on a carrier medium." Claim 54 now recites sufficient structure and, accordingly, is directed to statutory subject matter. For similar reasons, claims 56-63, which depend from claim 54, are also directed to statutory subject matter.

Double-Patenting Rejections

Claims 10 and 14 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 8 of copending U.S. Patent

Application Serial No. 10/138,178. Applicant will address this provisional rejection upon the indication of allowable subject matter in claims 10 and 14 and will, if necessary, file a terminal disclaimer.

Rejections under 35 U.S.C. § 102

Claims 9-11, 14, 16, 22, 28, 39, 45, 51, 53, 54 and 60 were rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,683,988 to Fukunaga et al. (hereinafter “Fukunaga”). Applicant respectfully traverses this rejection for at least the following reasons.

As a preliminary matter, Applicant notes that the Office Action cites the reference as “Fukunaga et al (6,438,165)”. However, U.S. Patent No. 6,438,165 is the Normile reference cited later in the Office Action. Applicant believes that the Fukunaga reference cited by the Examiner refers to U.S. Patent No. 6,683,988. Accordingly, Applicant’s responses to all rejections citing Fukunaga are based on this belief that the Examiner intended to cite U.S. Patent No. 6,683,988 as Fukunaga.

Embodiments of the present invention provides for the encoding and decoding of video signals representing a sequence of pictures. In one embodiment, the encoding of a video signal includes obtaining a prediction for a current picture of the sequence or a part of the current picture from a local default reference picture. An indicator is generated for the current picture or a part of the current picture. The indicator identifies an alternative reference picture for prediction of the current picture or a part of the current picture when a remote default reference picture corresponding to the local default reference picture cannot be reconstructed in a subsequent remote decoding process. The indicator is transmitted for use in the subsequent remote decoding process when decoding the current picture or a part of the current picture.

In this regard, an encoder according to an embodiment of the present invention can operate independently of the decoder. Further, there is no need for the encoder to alter the way in which the pictures to be transmitted are to be encoded in the event of an error at the decoder.

Rather, the indicator transmitted from the encoder to the decoder provides sufficient information for the decoder to independently select an alternative reference picture for use in decoding the current picture.

Accordingly, independent claim 10 recites an “indicator identifying an alternative reference picture” for prediction of the current picture or a part of the current picture when a default reference picture cannot be reconstructed. Each of independent claims 9, 11, 14, 53 and 54 recite a similar feature.

In sharp contrast, Fukunaga fails to teach or suggest any alternative reference frame which is signaled from the encoder to the decoder. Fukunaga relates to a picture transmission system that transmits a series of pictures from an encoding apparatus to a decoding apparatus, each picture being encoded and subsequently decoded with reference to a preceding (reference) picture. When a transmission error occurs, the decoding apparatus detects a decoding error caused by the transmission error and sends an error signal to the encoding apparatus. The encoding apparatus and decoding apparatus then both modify part of a reference picture affected by the decoding error, making identical modifications. A subsequent picture is then encoded and decoded with reference to the modified reference picture, thereby enabling recovery from the transmission error (see Fukunaga, Abstract).

The only signal that is transmitted from the encoder to the decoder in Fukunaga is the "end-of-modification signal", which tells the decoder to stop modifying the reference frames. Further, the end-of-modification signal does not instruct the decoder to use a different reference frame than it would otherwise use. In the example of Figure 6 of Fukunaga, decoding of frame 4 is always conducted using modified frame 3, whether or not the end-of-modification signal is received.

According to the disclosure of Fukunaga, in the event that the decoder does not receive an end-of-modification signal before starting to decode frame 4, it will decode frame 4 with reference to modified frame 3, copying any blocks affected by the error in frame 2 from modified

frame 3. In the event that the decoder receives an end-of-modification signal in connection with frame 4, the decoder will still decode frame 4 with respect to modified frame 3. Rather, in this case, the decoder will use regular motion compensated prediction with respect to the modified frame 3, since the decoder knows (as a result of receiving the end-of-modification signal) that the encoder has now made equivalent modifications to frame 3 and has predicted frame 4 with respect to modified frame 3.

Furthermore, because the system of Fukunaga requires synchronicity between the encoder and decoder, it must operate in real time. Specifically, Fukunaga's error concealment method requires feedback from the decoder to control the encoding process. Thus, Fukunaga's system cannot be applied to pre-encoded video sequences, such as those used in streaming applications, since there is no possibility to send feedback and affect the way in which the video stream is encoded. In such a system, it is therefore advantageous for error concealment methods to work without the need for feedback to the encoder, as provided by embodiments of the present invention.

In embodiments of the present invention, because the encoder provides the indicator, it enables the decoder to operate independently to conceal transmission errors. Accordingly, the present invention can be used in streaming applications in addition to real time applications.

For these reasons, the end-of-modification signal in Fukunaga cannot be equated with the indicator of the present claimed invention.

Since Fukunaga fails to teach or suggest at least this feature of independent claims 9-11, 14, 53 and 54, claims 9-11, 14, 53 and 54 are patentable. Claims 16 and 22 depend from allowable claim 14 and are, therefore, patentable for at least that reason, as well as for additional patentable features when those claims are considered as a whole. Similarly, claim 28 depends from allowable claim 9; claims 39 and 45 depend from allowable claim 10; claim 51 depends from allowable claim 11; and claim 60 depends from allowable claim 54. Therefore, claims 28,

39, 45, 51 and 60 are patentable for at least that reason, as well as for additional patentable features when those claims are considered as a whole.

Rejections under 35 U.S.C. § 103

Claims 1, 19, 24, 32, 35, 42 and 56 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Fukunaga in view of U.S. Patent No. 6,188,728 to Hurst (hereinafter “Hurst”). Claims 5, 15, 25, 26, 36, 37, 48, 49, 57 and 58 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Fukunaga in view of U.S. Patent No. 5,455,629 to Sun et al. (hereinafter “Sun”). Claims 6, 27, 38, 50 and 59 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Fukunaga in view of ITU-Telecommunications Standardization Sector (Proposed Draft of modified Annex L including Copyright, normative Error Concealment, and Exact IDCT Signaling (hereinafter “ITU”). Claims 2, 17, 18, 29, 30, 33, 40, 41, 61 and 62 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Fukunaga in view of U.S. Patent No. 5,515,388 to Yagasaki (hereinafter “Yagasaki”). Claims 12, 21, 31, 44, 52 and 63 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Fukunaga in view of U.S. Patent Publication No. 2002/0009141 A1 to Yamaguchi et al. (hereinafter “Yamaguchi”). Claims 20 and 43 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Fukunaga and Hurst and further in view of U.S. Patent No. 6,438,165 to Normile (hereinafter “Normile”). As to canceled claim 30, the rejection is moot. Applicant respectfully traverses these rejections for at least the following reasons.

Independent claim 12 recites features similar to those described above with reference to independent claims 9-11, 14, 53 and 54. As noted above, Fukunaga fails to teach or suggest any alternative reference frame which is signaled from the encoder to the decoder. None of the other references cited in the Office Action teach or suggest this feature. Accordingly claim 12 is patentable for reasons similar to the patentability of independent claims 9-11, 14, 53 and 54.

Claims 1-2, 5-6, 15 and 17-21 depend, either directly or indirectly, from allowable claim 14 and are, therefore, patentable for at least that reason, as well as for additional patentable features when those claims are considered as a whole.

Similarly, claims 24-27, 29 and 31 depend from allowable claim 9; claims 32-33, 35-38 and 40-44 depend from allowable claim 10; claims 48-50 and 52 depend from allowable claim 11; and claims 56-59 and 61-63 depend from allowable claim 54. Therefore, claims 24-27, 29, 31-33, 35-38, 40-44, 48-50, 52, 56-59 and 61-63 are patentable for at least that reason, as well as for additional patentable features when those claims are considered as a whole.

New Claims

Applicant has added new claims 64-70. Support for the subject matter of claims 64-70 can be found in the originally filed specification, claims and figures. No new matter is added.

New claims 64 and 65 depend, either directly or indirectly, from allowable claim 14 and are, therefore, patentable for at least that reason, as well as for additional patentable features when those claims are considered as a whole. Similarly, new claim 67 depends indirectly from allowable claim 10 and is, therefore, patentable for at least that reason, as well as for additional patentable features when that claim is considered as a whole.

New claims 66 and 68-70 recite features similar to those described above with reference to independent claims 9-12, 14 and 53-54. Therefore, claims 66 and 68-70 are patentable for reasons similar to the patentability of claims 9-12, 14 and 53-54.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-0872. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-0872. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-0872.

Respectfully submitted,

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